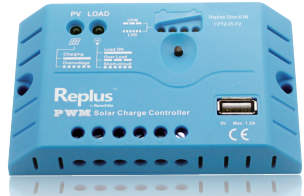
Replus™
by ReneSola



Replus DirectON Series User manual

CP12-05-P2 / CP1224-10-P2 / CP1224-20-P2

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Nominal System Voltage	CP12-05-P2	12VDC
	CP1224-10-P2/CP1224-20-P2	12/24VDC
Maximum PV Input Voltage	CP12-05-P2	30V
	CP1224-10-P2/CP1224-20-P2	50V
Nominal Charge/Discharge Current	CP12-05-P2	5A
	CP1224-10-P2	10A
	CP1224-20-P2	20A
USB Output	ALL	5VDC/1.2A

1 Important Safety Information

- Read all of the instructions and cautions in this manual before starting installation.
- There are no user serviceable parts inside the controller. Do not disassemble or attempt to repair it.
- Install external fuses/breakers as required.
- Disconnect all fuses and breakers to the controller prior to installing or adjusting the controller.
- Do not allow water to enter the controller.
- Confirm that power connections are tightened to avoid excessive heating generated by loose connections.

2 General Information

The DirectON Series –P2 solar charge controller is economic, practical and easy to use, etc. It has various unique functions:

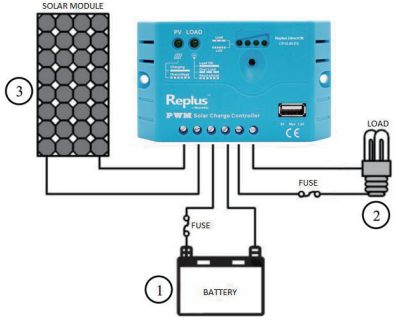
- High efficient Series PWM charging increases battery life and improves the overall solar system performance.
- Battery LED indicators indicate system status.
- Supports 3 charging options: Sealed, Gel and Flooded Batteries.
- Built in temperature compensation automatically corrects charging and discharging parameters and improves battery life.
- Electronic protection includes protection for overload, short circuit, battery over discharge, over voltage, low voltage and reverse polarity.
- The USB will provide a 5VDC output that can be used for the charging of electronic equipment.

3 Installation Instructions

3.1 Mounting

- Read through the entire installation section prior to installation.
- Be very careful when working with batteries. Wear eye protection. Have fresh water available to wash and clean any contact with battery acid.
- Use insulated tools and do not place metal objects near the batteries.
- Explosive battery gasses may be present during charging. Ensure that there is sufficient ventilation to release the gasses.
- Avoid direct sunlight and do not install in locations where water can enter the controller.
- Loose power connections and/or corroded wires may result in resistive connections that melt wire insulation, burn surrounding materials, or even cause a fire. Ensure tight connections and use cable clamps to secure cables and prevent them from swaying in mobile applications.
- Use with Gel, Sealed or Flooded lead acid batteries only.
- Battery connection may be wired to one battery or a bank of batteries. The following instructions refer to a singular battery, but it is implied that the battery connection can be made to either one battery or a number of batteries in parallel or in series.
- Select the system cables according to 3.5A/mm2 current density.

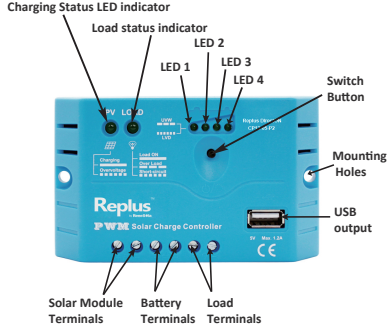
3.2 Wiring



1. Connect components to the charge controller in the sequence as shown in above picture and pay attention to the "+" and "-".Always connect the battery first.
2. After the battery is connected, check the battery indicator on the controller - it should be green. If it's not green, please refer to chapter 5.
3. The load must be a DC load of the same rated voltage as battery. The controller provides power to the load at the same voltage as that of the battery.

4 Operation

4.1 Features



Charging and load status indicator

Indicator	Indicator Status	System Status	Note
Charging Status Indicator	ON	Charging	Normal
	Flashing Fast	Over Voltage	Refer to section 5
Load Status Indicator	ON	ON	Normal
	OFF	OFF	
	Flashing Slow	Overload	When the load amp is 1.25 times of the rated current for 60 seconds, or the load amp is 1.5 times of rated current for 5 seconds
	Flashing Fast	Short Circuit	Refer to section 5

Battery status indicator (LED1、LED2、LED3、LED4)

Battery LED indicator (The parameters in the table below is for a 12VDC system at 25°C, for a 24VDC system the values must be doubled)

LED 1	LED 2	LED 3	LED 4	Battery Status
Flashing Slow	×	×	×	Under voltage
Flashing Fast	×	×	×	Over discharged
Battery LED indicator status during voltage is up				
○	○	×	×	12.8V＜ U_{bat} ＜13.4V
○	○	○	×	13.4V＜ U_{bat} ＜14.1V
○	○	○	○	14.1V ＜ U_{bat}
Battery LED indicator status during voltage is down				
○	○	○	×	12.8V＜U_{bat}＜13.4V
○	○	×	×	12.4V＜U_{bat}＜12.8V
○	×	×	×	U_{bat}＜12.4V

"○"LED indicates on " ×"LED indicates off "U_{bat}"battery voltage

4.2 Setting Operation

- **Load Work Mode Setting**

When the controller is powered on, press the setting button to control the load output. When the button is pressed once, the ON/OFF status will change correspondingly. The USB Output is ON only when the Load Work Mode is ON status.

- **Battery Type Setting**

Press the "Setting" button for more than 5 seconds. The battery indicator LED1, LED2, LED3 will be flashing correspondingly. Then press the setting button again to select between Sealed, Gel, and Flooded battery type. When the correct battery has been selected, stop pressing the button and the setting is complete when the lights stop flashing. The parameters indicated are shown below:

- **Battery type selection**

LED 1	LED 2	LED 3	Battery type
○	×	×	Sealed lead acid battery
○	○	×	Gel battery
○	○	○	Flooded battery

"○"LED indicator on "×"LED indicator off

5 Protection and Troubleshooting

5.1 Protection

- **Load Overload**
  If the load current exceeds 1.25 of the rated current for 60 seconds, or if the load current is 1.5 times of rated current for 5 seconds, the controller will disconnect the load. The cause of the overload must be cleared by re-powering or by pressing the setting button.
- **Load Short Circuit**
  The controller provides automatic protection from short circuiting of the load wiring (more than 2 times rated current). On automatic load reconnect attempt, the fault must be cleared by reapplying power or by pressing the setting button.
- **Battery Reverse Polarity**
  The controller is protected from battery reverse polarity. Correct the wiring mistake and resume normal operation.
- **Damaged Local Temperature Sensor**
  If the temperature sensor is short-circuited or damaged, the controller will be charging and/or discharging at the default temperature 25°C setting..
- **High Voltage Transients**
  PV is protected from high voltage transients. In lightning prone areas, additional external surge protection is recommended.

5.2 Troubleshooting

Faults	Possible reasons	Troubleshooting
Charging LED indicator OFF during daytime when sun is shining on PV modules.	PV array disconnection	Check that PV and battery wire connections are correct and tight.
Charging LED indicator FLASHES FAST.	Battery voltage higher than over voltage disconnect voltage(OVD)	Check if battery voltage is too high. Disconnect the solar module.
Battery LED1 indicator FLASHES SLOWLY	Battery under voltage	When load output is normal, LED status will return to ON automatically once battery is charged.
Battery LED1 indicator FLASHES FAST	Battery over discharged	When the controller cuts off the output automatically, LED status will return to ON automatically when battery is charged.
Load LED indicator FLASHES SLOW	Overload	Please reduce the load and press the button once, the controller will resume to work after 3s.
Load LED indicator FLASHES FAST.	Short circuit	When the first short-circuit occurs, the controller will automatically resume to work after 10s; when a second short-circuit occurs, press the button, the controller will resume working after 3s.
No LED indicator	Battery voltage lower than 6V	Measure battery voltage with multi-meter. A minimum of 6V is required to start up the controller.
No charging status LED indicator with normal connection	Input voltage of solar module lower than battery voltage	Measure the input voltage of solar module, the input voltage must be higher than battery voltage.

6 Technical specifications

Electrical Parameters

Description	Type	Parameter
Nominal System Voltage	CP12-05-P2	12VDC
	CP1224-10-P2/ CP1224-20-P2	12/24VDC
Maximum battery voltage to the controller	CP12-05-P2	16V
	CP1224-10-P2/ CP1224-20-P2	32V
Rated Battery Current	CP12-05-P2	5A
	CP12-10-P2/ CP1224-10-P2	10A
	CP1224-20-P2	20A
Charge Circuit Voltage Drop	ALL	≤0.26V
Discharge Circuit Voltage Drop	ALL	≤0.15V
Self-consumption	ALL	≤6mA

Temperature Compensation Coefficient

Description	Parameter
Temperature Compensation Coefficient*	-5mV/℃/2V (ref)

*** Temperature compensation of equalize, boost, float and low voltage disconnect voltage**

Environmental parameters

Environmental parameters	Parameter
Working temperature	-35℃～+55℃
Storage temperature	-35℃～+80℃
Humidity	≤95% N.C
Enclosure	IP20

The parameters in the table on the next page is for a 12VDC system at 25˚C. For a 24VDC system these parameters must be doubled."

Battery Voltage Parameters

Charging Parameters			
Battery charging setting	**Sealed**	**Gel**	**Flooded**
Over Voltage Disconnect Voltage	16V	16V	16V
Charging Limit Voltage	15.5V	15.5V	15.5V
Over Voltage Reconnect Voltage	15V	15V	15V
Equalize Charging Voltage	14.6V	-------	14.8V
Boost Charging Voltage	14.4V	14.2V	14.6V
Float Charging Voltage	13.8V	13.8V	13.8V
Boost Reconnect Charging Voltage	13.2V	13.2V	13.2V
Low Voltage Reconnect Voltage	12.6V	12.6V	12.6V
Under Voltage Warning Reconnect Voltage	12.2V	12.2V	12.2V
Under Voltage Warning Voltage	12V	12V	12V
Low Voltage Disconnect Voltage	11.1V	11.1V	11.1V
Discharging Limit Voltage	10.5V	10.5V	10.5V
Equalize Duration	2 hours	-------	2 hours
Boost Duration	2 hours	2 hours	2 hours

Mechanical Parameters

Type	CP12-05-P2
Overall Dimension	109.7x65.5x20.8mm
Mounting dimension	100.9mm
Mounting hole size	Φ4.5
Terminal	2.5mm²
Weight	95g

Mechanical Parameters

Type	CP1224-10-P2	CP1224-20-P2
Overall Dimension	120.3x67x21.8mm	148x85.6x34.8mm
Mounting dimension	111.5mm	138mm
Mounting hole size	Φ4.5	Φ4.5
Terminal	4mm²	6mm²
Weight	102g	179.6g

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Changes may be made without prior notice!
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